

1 CLAIMS

2 1. A method comprising:
3 collecting entropy data;
4 storing the entropy data in a nonvolatile memory;
5 updating the entropy data stored in the nonvolatile memory with newly
6 collected entropy data; and
7 generating a string of random bits from the entropy data stored in the
8 nonvolatile memory.

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10 2. A method as recited in claim 1 wherein the entropy data is collected
11 from multiple sources.

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13 3. A method as recited in claim 1 wherein the entropy data is collected
14 from multiple sources within a computer system.

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16 4. A method as recited in claim 1 wherein the entropy data includes data
17 related to a processor in a computer system.

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19 5. A method as recited in claim 1 wherein the entropy data includes data
20 related to an operating system executing on a computer system.

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22 6. A method as recited in claim 1 wherein the entropy data is maintained
23 in a protected portion of an operating system kernel.

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7. A method as recited in claim 1 wherein the method is executing on a system and the entropy data is inaccessible by an application program executing on the system.

8. A method as recited in claim 1 wherein generating a string of random bits includes hashing the entropy data to generate random seed data.

9. A method as recited in claim 1 wherein updating the entropy data stored in the nonvolatile memory includes collecting new entropy data at periodic intervals.

10. A method as recited in claim 1 further including communicating the string of random bits to an application program requesting a random number.

(b) (1)

11. One or more computer-readable memories containing a computer program that is executable by a processor to perform the method recited in claim 1.

12. A method comprising:
receiving a request for a random number;
retrieving entropy data from a nonvolatile memory device, wherein the entropy data is regularly updated with newly collected entropy data;)
hashing the entropy data to create random seed data;
generating a string of random bits from the random seed data; and

(b) (1)

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2 *for a random number.*
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5 13. A method as recited in claim 12 wherein the entropy data is
6 collected from multiple sources within a computer system.
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9 14. A method as recited in claim 12 wherein the entropy data includes
10 data related to a state of a processor in a computer system and data related to a
11 state of an operating system executing on the computer system.
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14 15. A method as recited in claim 12 wherein the entropy data is
15 maintained in a protected portion of an operating system kernel.
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18 16. A method as recited in claim 12 wherein the random seed data is
19 maintained in a protected portion of an operating system kernel.
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22 17. A method as recited in claim 12 wherein the entropy data is
23 inaccessible by the requester of the random number.
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18. One or more computer-readable memories containing a computer
program that is executable by a processor to perform the method recited in claim
12.

19. A method comprising:
2 collecting entropy data;
3 storing the entropy data in a protected portion of an operating system
4 kernel; and
5 generating a string of random bits based on the entropy data.

6
7 20. A method as recited in claim 19 wherein the entropy data is
8 collected from multiple sources.

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10 21. A method as recited in claim 19 wherein the entropy data is
11 inaccessible by an application program.

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13 22. A method as recited in claim 19 further comprising updating the
14 entropy data with newly collected entropy data.

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16 23. A method as recited in claim 19 further comprising communicating
17 the string of random bits to an application program requesting a random number.

18 — /
19 24. One or more computer-readable memories containing a computer
20 program that is executable by a processor to perform the method recited in claim
21 19.

25. An apparatus comprising:

2 a nonvolatile memory configured to store entropy data, wherein the entropy
3 data stored in the nonvolatile memory is updated regularly; and

4 a random number generator coupled to the nonvolatile memory, wherein
5 the random number generator utilizes the entropy data stored in the nonvolatile
6 memory to generate strings of random bits.

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8 26. An apparatus as recited in claim 25 wherein the entropy data is
9 collected from multiple sources.

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11 27. An apparatus as recited in claim 25 wherein the entropy data is
12 updated at periodic intervals.

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14 28. An apparatus as recited in claim 25 wherein the entropy data is
15 maintained in a protected portion of an operating system kernel such that the
16 entropy data is inaccessible by an application program.

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18 29. An apparatus as recited in claim 25 wherein the entropy data
19 includes data related to a processor in a computer system and an operating system
20 executing on the computer system.

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22 30. An apparatus as recited in claim 25 wherein the random number
23 generator hashes the entropy data to generate random seed data.

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2 **31.** An apparatus as recited in claim 25 further including a timer
3 coupled to the random number generator, the timer indicating when to update the
4 entropy data stored in the nonvolatile memory device.

5 **32.** One or more computer-readable media having stored thereon a
6 computer program that, when executed by one or more processors, causes the one
7 or more processors to:

8 collect entropy data from multiple sources;
9 store the collected entropy data in a nonvolatile memory;
10 update the entropy data stored in the nonvolatile memory with newly
11 collected entropy data; and

12 produce a string of random bits from the entropy data stored in the
13 nonvolatile memory.

14
15 **33.** One or more computer-readable media as recited in claim 32
16 wherein the entropy data includes data related to a state of one or more processors.

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18 **34.** One or more computer-readable media as recited in claim 32
19 wherein the entropy data is maintained in a protected portion of an operating
20 system kernel.

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22 **35.** One or more computer-readable media as recited in claim 32
23 wherein the entropy data includes data related to a state of an operating system
24 executing on a computer system.

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1 36. One or more computer-readable media as recited in claim 32
2 wherein to produce a string of random bits from the entropy data, the one or more
3 processors hash the entropy data to generate random seed data.

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5 37. One or more computer-readable media as recited in claim 32
6 wherein the entropy data stored in the nonvolatile memory is updated with newly
7 collected entropy data at periodic intervals.

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